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## COLLOQUIUM

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**SPEAKER**

Prof. Ja Yil Lee

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**TITLE**

Watch proteins playing on a single DNA molecule

**ABSTRACT**

Protein-DNA interactions are an essential basis of life. Diverse biological phenomena can be elucidated by studying protein-DNA interactions. Recently the advent of single-molecule spectroscopy enables us to inspect how proteins are functioning on DNA in more detail. Among many single-molecule techniques, the DNA curtain techniques, which are hybrid systems combining nano-technique and fluorescence microscopy, provide unique platforms to directly visualize individual proteins playing on a single DNA molecule in real time. Using the double-stranded DNA curtain technique, we studied a DNA translocase FtsK that is rapidly moves on DNA. We characterized the biophysical properties of FtsK and investigated the collision of FtsK with other DNA binding proteins. This study gives us an insight into how proteins cope with the crowded environments of DNA inside cells. On the other hand, using the single-stranded DNA curtain technique, we investigated the homologous recombination that is a repair pathway of DNA double-strand break. We examined how recombinase proteins (Rad51/RecA family) search for homologous sequences and how they accomplish the strand exchange reactions. Also we looked into how mismatched bases affect the reactions. Furthermore we demonstrated that the homology search and strand exchange mechanisms are evolutionary conserved from bacteria to human being.

**DATE AND VENUE**

Apr. 26, 2016 (1:00-2:00 p.m.)

Seminar room 116, R&D Center